GB1298200

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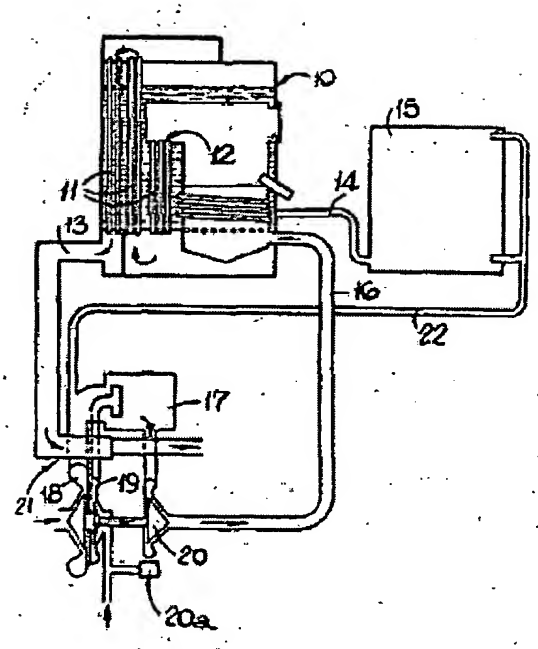
Tiivistelmä **GB1298200**

1298200 Water heaters CAV Ltd 13 Feb 1970 [25 Feb 1969 21 Nov 1969] 9908/69 and 57182/69 Headings F4A and F4B A boiler system 10, the firing chamber 12 of which is supplied with either pulverized fuel or liquid fuel through a feed pipe 14 from a bunker 15 and combustion supporting gas is supplied to the chamber 12 by way of conduit 16, is provided with a combustion chamber 17 which is supplied with air by means of a compressor 18, and air-fuel mixture by means of a compressor 19. The two compressors are driven by a tur- bine 20 which receives the combustion gases leaving the chamber 17. The conduit 16 is con- nected to the outlet of the turbine 20 so that the gases leaving the chamber 17 constitute the combustion supporting gas for the chamber 12. In order to supply the fuel to the chamber 12, the bunker 15 is connected via conduit 22 to the outlet of the compressor 18.



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Selitys **GB1298200**

(54) BOILER SYSTEMS
(71) We, C.A.V. LIMITED, a British Company, of Well Street, Birmingham 19, do hereby declare this invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the followingstatement:
This invention relates to boiler systems of the kind including a boiler firing chamber and means for admitting combustion supporting gas and fuel to said chamber.

Such systems are known in which the combustion gas is supplied by a motor driven fan and the fuel by means of a high pressure pulup when liquid fuel is used or by means of air under pressure when solid pulverised fuel is used. Such systems require the provision of separate motors andlurthermore the pro vision of an external source of power.

The object of the present invention is to provide such a system in a simple and con venient form.

According to the invention in a system of the kind specified said means comprises a com bustion chamber, compressor means for delivering air and fuelpo the combustion chamber forburn nag therein, a turbine driven by theheated gases leaving thecmbustion chamber fordiivin thecoinpre:dr mU.lll-, first conduit means throughwhich the gases leaving the turbine can be supplied to the boiler firing chamber as combustion support ing gas, and second conduit means through which air under pressure from said compressor means flows, said air under pressure being used to deliver fuel to the boiler firing chamber.

Oneexample of a boilersystem in accord ance with the invention will now be described with reference to theaccompanying drawings in which reference numeral 10 indicates a boiler which is provided with sets of tubes 11 throughwhich gases from the boiler firing chamber 12 canposs to an outlet conduit 13.

The firing chamber 12 is supplied with pul verised fuel through a feed pipe 14 from a bunker 15 and combustion supporting gas is supplied to the firing chamber by way of a conduit 16.

Also provided is a combustion chamber 17 which is supplied with dilution air by means of a compressor 18. The combustion chamber accommodates a burner which is suppliedwith an air fuel mixture by means of a compressor 19. The two compressors are driven by a turbine 20 which receives the heated gases leaving the combustion chamber 17. Moreover, the conduit 16 is connected to the outlet of the turbine 20 so that the gases leaving the combustion chamber 17 constitute the combustion supporting gas for supply to the firing chamber. The fuel which is consumed in the combustion chamber 17 may be gaseous or liquid and is supplied from a source 20a.

The outlet 13 from the boiler 10 passes to a heat exchanger 21 which effects heat exchange between the gases leaving the boiler and the gases entering the combustion chamber.

In order to supply the pulverizedtuel to the boiler firing chamber12, bunker15 iscon nected by way of a conduit 22 to the outlet of the compressor 18 and the conduit is in communication with the bunker at an upper and a lower point.

Inoperatioli the gasesleaving the @@bine 20 constitutecombustion supporting gas for use in the boiler firing chamber 12 and fuel is supplied to thefiringr chamber from the bunker. By reducing the quantity of fuel supplied by way of the compressor 19, to the combustion chamber 17, the amount of heat produced in the boiler can be reduced.

The maximum output from the boiler is obtained when the maximum allowable quantity of fuel is fed to the combustion chamber 17, this producing the highest temperature which can be tolerated by the blades of the turbine 20. In order to start the boiler system from cold it is necessary first of all to bring the turbine and compressor rotors up to a predetermined speed prior to the admission of fuel to the combustion chamber and ignition thereof within the combustionchamber. The heated gases leaving the turbine 20 are sufficiently hot to ignite the pulverized fuel supplied by way of the pipe 14 and this avoids the necessity for providing a supplementary ignitionmeans in the boiler firing chamber.

12. If desired the gases leaving the heat exchanger 21 can be used to dry fuel for future use.

The bunker 15 can be replaced by a liquid fuel tank and it is only necessary to pressurize the fuel tank to cause the fuel to be forced into the boiler. This provides an extremely convenient method of controlling the output of the boiler system since the pressure of air delivered by the compressor when the latter is of the radial flow type, is clearly proportional to the mass flow of air..

The system described has the advantage over conventional systems that once started the system is self sustaining. Moreover, the fuel which is consumed in the boiler can be of low quality and the products of combustion will have no effect upon the blades of the turbine.

The control of fuel flowing from the source 20a is by means of a simple adjustable orifice in the case of gaseous fuel and in the case of liquid fuel a simple carburettor can be used.

WHAT WE CLAIMIS: -

1. A boiler system of the kind including a boiler firing chamber, and means for admitting combustion supporting gas and fuel to the boiler firing chamber, said means comprising a combustion chamber, compressor means for delivering air and fuel to the combustion chamber, a turbine driven by the heated gases leaving the combustion chamber for driving the compressor means, first conduit means through which the gases leaving the turbine can be supplied to the boiler firing chamber as combustion supporting gas, and second conduit means through which air under pressure from said compressor means flows, said air under pressure being used to deliver fuel to the boiler firing chamber.

2. A boiler system as claimed in claim 1, including a container for the fuel which is to be supplied to the boiler firing chamber, said second conduit means communicating with said container.

3. A boiler system as claimedin claim 2 in which said compressor means comprises first and second compressors for supplying dilution air and air fuel mixture to said combustion chamber respectively.

4. A boiler system as claimed in claim 3 which the fuel for the boiler firing chamber is pulverized fuel.

5. A boiler system as claimed in claim 3 in which the fuel for the boiler firing chamber is liquid fuel.

6. A boiler system substantially as herein before described with reference to and as shown in the accompanying drawing.

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